

MODIFICATIONS TO CLAIM STATUS

- A) Claims 13, 16—20 remain in their original form;
- B) Claims 1, 3, 4, 12, 14, 15, 21 and 22 are currently amended; and
- C) Claim 2 and 5—11 are is cancelled.

Listing of Claims

1. (currently amended) A biomass gasifier apparatus, comprising:
 - (A) a fuel input system;
 - (B) a fluidized bed gasifier cell, configured to receive fuel from the fuel input system; ~~and system, comprising:~~
 - (a) bed material, carried at a base of the fluidized bed gasified cell;
 - (b) a fluidizing gas plenum, carried within the fluidized bed gasifier cell;
 - (c) a plurality of manifolds, arranged within the fluidized bed gasifier cell, wherein a space defined between adjacent manifolds is sufficient to allow tramp material to pass downwardly; and
 - (d) a plurality of nozzles, supported by each manifold, wherein gas released by the plurality of nozzles fluidizes the bed material; and
 - (C) wherein the fluidized bed gasifier cell is configured to receive heated gas, and to exhaust a mixture of gases, char and ash from an upper portion of the gasifier cell.

2. (cancelled)

3. (currently amended) The biomass gasifier apparatus of claim 1, ~~claim 2~~, additionally comprising:

(A) a cyclone, having an input in communication with the fluidized bed gasifier cell, for receiving a mixture of gases, char and ash from an upper portion of the fluidized bed gasifier cell, and for separating the mixture into first and second outputs, comprising a first output exhausting a mixture of low BTU gas, and a second output exhausting gas carrying a mixture of ash and char.

4. (currently amended) The biomass gasifier apparatus of claim 1, ~~claim 2~~, additionally comprising:

(A) a bed change-out system, in communication with the fluidized bed gasifier cell, for removing tramp, clinkers and other waste from the bed material.

5—11 Cancelled.

12. (currently amended) The biomass gasifier apparatus of ~~claim 4, wherein~~
the secondary gas clean up system comprises: claim 1, additionally
comprising:

(A) a cyclone, having an input in communication with the fluidized bed
gasifier cell, for receiving a mixture of gases, char and ash from an
upper portion of the gasifier cell, and for separating the mixture
into first and second outputs, comprising a first output exhausting a
mixture of low BTU gas, and a second output exhausting gas
carrying a mixture of ash and char.

13. (original) The biomass gasifier apparatus of claim 12, additionally
comprising:

(A) a char combustion cell, having an input connected to the second
output of the cyclone, oxidizes the char at elevated temperatures.

14. (currently amended) The biomass gasifier apparatus of claim 13,
additionally comprising:

(A) a heat exchanger, having ~~a first an~~ an input connected to an output of
the char combustion cell, ~~receives to receive~~ receives to receive gas leaving the char
combustion cell and ~~removes to remove~~ removes to remove heat energy.

15. (currently amended) The biomass gasifier apparatus of claim 14, additionally comprising:

(A) a ~~secondary~~ gas cleanup unit, having an input connected to a ~~first~~ an output of the heat exchanger, ~~receives to receive~~ gases discharged from the char combustion cell that have been cooled by the heat exchanger, ~~and removes to remove~~ ash from the gas and ~~exhausts to exhaust~~ cleaned gas through an output.

16. (original) The biomass gasifier apparatus of claim 15, wherein the secondary gas clean-up system comprises:

(A) a multi-clone unit.

17. (original) The biomass gasifier apparatus of claim 15, wherein the secondary gas clean-up system comprises:

(A) a cyclone.

18. (original) The biomass gasifier apparatus of claim 15 wherein the secondary gas clean-up system comprises:

(A) a ceramic filter.

19. (original) The biomass gasifier apparatus of claim 15, wherein the secondary gas clean-up system comprises:

(A) a baffle device.

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2 20. (original) The biomass gasifier apparatus of claim 14, additionally
3 comprising:

4 (A) a fluid bed gasifier fan, having an input connected to the output of
5 the gas cleanup unit, forces a gas mixture of the cleaned gas from
6 the gas cleanup unit and additional gas at high pressure into a
7 second input of the heat exchanger, wherein the gas mixture is
8 heated, exhausted from a second output of the heat exchanger, and
9 delivered to the fluidizing gas plenum of the fluid bed gasifier cell.
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21. (currently amended) A biomass gasifier apparatus, comprising:

(A) a fuel input system;

(B) a fluidized bed gasifier cell, configured to receive receiving-fuel
from the fuel input system;—system, the fluidized bed gasifier cell
comprising:

(a) bed material, carried at a base of the fluidized bed gasified
cell;

(b) a fluidizing gas plenum, carried within the fluidized bed
gasifier cell;

(c) a plurality of manifolds, arranged within the fluidized bed
gasifier cell, wherein a space defined between adjacent
manifolds is sufficient to allow tramp material to pass
downwardly; and

(d) a plurality of nozzles, supported by each manifold, wherein
gas released by the plurality of nozzles fluidizes the bed
material; and

(C) wherein a mixture of gases, char and ash is exhausted from
an upper portion of the fluidized bed gasifier cell;

(D) a cyclone, having an input in communication with the fluidized bed
gasifier cell, for receiving a mixture of gases, char and ash from an
upper portion of the fluidized bed gasifier cell, and for separating
the mixture into first and second outputs, comprising a first output

1 exhausting a mixture of low BTU gas, and a second output
2 exhausting gas carrying a mixture of ash and char; and

3 (E) a char combustion cell, having an input connected to the second
4 output of the cyclone, ~~oxidizes~~ for oxidizing the char at elevated
5 temperatures; and

6 (F) wherein gas heated within the char combustion cell is ~~use~~ used to
7 fluidize the fluidized bed gasifier cell.
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22. (currently amended) A biomass gasifier apparatus, comprising:

- (A) a fuel input system;
- (B) a fluidized bed gasifier cell, configured to receive receiving-fuel from the fuel input system, wherein the fluidized bed gasifier cell comprises: comprising:
 - (a) bed material, carried at the base of the fluidized bed gasified cell;
 - (b) a fluidizing gas plenum, carried within the fluidized bed gasifier cell;
 - (c) a plurality of manifolds, arranged within the fluidized bed gasifier cell, wherein a space defined is sufficient between adjacent manifolds is sufficient to allow tramp material to pass downwardly; and
 - (d) a plurality of nozzles are supported by each manifold, wherein gas released by the nozzles fluidizes the bed material; and
- (C) a bed change-out system, in communication with the fluidized bed gasifier cell, for removing tramp, clinkers and other waste from the bed material;
- (D) a cyclone, having an input in communication with the fluidized bed gasifier cell, for receiving a mixture of gases, char and ash from an upper portion of the fluidized bed gasifier cell, and for separating the mixture into first and second outputs, comprising a first output

1 exhausting a mixture of low BTU gas, and a second output
2 exhausting gas carrying a mixture of ash and char;

3 (E) a char combustion cell, having an input connected to the second
4 output of the cyclone, oxidizes the char at elevated temperatures;

5 (F) a heat exchanger, having a first input connected to an output of the
6 char combustion cell, receives gas leaving the char combustion cell
7 and removes heat energy;

8 (G) a gas cleanup unit, having an input connected to a first output of
9 the heat exchanger, receives gases discharged from the char
10 combustion cell that have been cooled by the heat exchanger, and
11 removes ash from the gas and exhausts cleaned gas through an
12 output; and

13 (H) a fluid bed gasifier fan, having an input connected to the output of
14 the gas cleanup unit, forces a gas mixture of the cleaned gas from
15 the gas cleanup unit and additional gas at high pressure into a
16 second input of the heat exchanger, wherein the gas mixture is
17 heated, exhausted from a second output of the heat exchanger, and
18 delivered to the fluidizing gas plenum of the fluid bed gasifier cell.
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